SECTION 301
AGGREGATE SURFACING

301.01 DESCRIPTION

This work is producing and placing one or more courses of aggregate surfacing on a prepared surface or producing and stockpiling aggregate surfacing.

301.02 MATERIALS

301.02.1 Aggregates

Obtain aggregates from sources meeting Section 106 requirements to produce material meeting Subsection 701.02.1 and the following Subsection requirements:

Selected Surfacing	701.02.2
Sand Surfacing	701.02.3
Crushed Base Course	701.02.4 and 701.02.5
Crushed Top Surfacing	701.02.6 and 701.02.7
Crushed Cover Aggregate	701.02.8

301.02.2 Binder

Binder material, for binding and gradation requirements, is fine, natural soil particles or crusher dust, free from grass, roots, weeds, humus, or other deleterious matter.

Add and blend the binder material when required with the aggregate surfacing to provide material meeting the specifications.

301.02.3 Blending Material

Blending material is selected natural or crushed mineral aggregate combined with the produced aggregate to meet specifications.

Do not use pit stripping's, overburden, or other deleterious material as blending material.

Furnish and add blending material to aggregate surfacing materials when required to meet gradation requirements.

The blending material must not increase the liquid limit and plastic limit of the surfacing material.

301.03 CONSTRUCTION REQUIREMENTS

301.03.1 Sampling, Testing, and Acceptance

A. Production Control. Develop a quality control sampling and testing plan for production and be responsible for all sampling and testing for gradation and mechanical fracture control during aggregate production.

B. Acceptance Sampling and Testing. The Project Manager will randomly select samples taken by the Contractor and witnessed by an Inspector, for gradation, fracture, and cleanness value testing from processed material on the roadway under MT-201. Samples for other tests will be taken at the point of production.

The following acceptance tests are used:

Gradation	MT-202
Mechanical Fracture	MT-217
Cleanness Value	MT-228

The largest quantity represented by each sample is 2,500 tons (2500 mt), excluding cover material, which is 500 tons (500 mt). Additional samples may be taken and tested.

The quantity represented by five samples is a lot when production schedules and material continuity permit. The Project Manager may establish a lot consisting of a quantity represented by three to seven consecutive random samples when there are short production runs, significant material changes, or other unusual characteristics of the work.

C. Acceptance. Surfacing aggregates are evaluated for gradation, mechanical fracture, and cleanness value on a lot-by-lot basis. The upper and lower limits in the gradation tables in Section 701 are the upper and lower limits in the evaluation formulas. The specified minimum fracture and cleanness values are the lower limit.

Develop a proposed job mix target aggregate gradation for each grade of crushed base aggregate to be produced. Establish a single target value for each specified aggregate size within the job mix target limits shown in Table 701-8. The job mix tolerance will be applied to the approved target values. Submit two copies of a completed job mix target aggregate gradation form to the Project Manager prior to beginning placement of the second lot on the roadway. If multiple sources are used for production, a completed job mix target aggregate gradation form may be submitted for each source prior to beginning placement of the second lot from each respective source. The submitted target aggregate gradation will be applied retroactively to the first lot for assessment. When the quality incentive allowance is waived in accordance with Subsection 105.03.3, the allowed band for each sieve size is equivalent to the job mix target limit with the tolerance applied to the low and high limit.

Acceptance is made under Subsection 105.03.2.

301.03.2 Equipment

A. Rollers. Use rollers meeting Subsection 210.03.4 requirements.

B. Watering Equipment. Use watering equipment meeting Subsection 210.03.5 requirements.

C. Scales. Furnish scales meeting Subsection 109.01.1 or use certified permanently installed commercial scales. Furnish and have readily available at least ten 50-pound (22.7 kg) weights for testing Contractor furnished scales. Furnish housing for the scale recording devices. Scale accuracy must be one-half of one percent at any weight.

Alternate weigh methods or devices may be acceptable, if they produce the required accuracy. Platform and belt-conveyor scale requirements are as follows:

1. Platform Scales. Use platform scales having the length to weigh an entire vehicle in an unbroken operation.

Truck-trailer combinations may be weighed separately if the scale approaches are:

a. Compacted gravel or asphalt;

b. Long enough and level with the scale platform to accommodate the entire truck-trailer units; and

c. Continually maintained.

Release all brakes as the unit is weighed.

2. Belt-conveyor Scales. Belt-conveyor scales may be used for non-asphaltic materials if the scale meets the general requirements for scales in Subsection 109.01.1 and the following:

a. The scale meets the National Bureau of Standards requirements for belt-conveyor scales, except as modified below.

b. A daily static-load test is made after approximately 1/2 hour of continuous belt conveyor operation and whenever the air temperature varies 15 °F (9 °C) or more.

Have a calibration test performed once daily and whenever the daily static-load test shows adjustments are required.

c. Make calibration computations, calibration procedures and results, and related documents available for the Project Manager's review. Clearly mark test chains with calibration constants. Carry test chains and test weights in protective containers and make immediately available for belt-conveyor scale testing.

d. Perform accuracy checks by checking the average of five or more sequential payloads of hauling units on approved platform scales. The acceptable accuracy is plus or minus 0.5 percent of the payload of the average hauling unit. If the recording odometer of the belt-conveyor scales in use is graduated to 0.1-ton (200 lb) (91 kg) increments and is a cumulative recording process, differences in readings and variations less than 0.1-ton (91 kg) may carry over from one hauling unit to another. Conveyor weight conformation is based on the tonnage obtained from readings taken from the sealed odometer at the beginning and end of each check period. The number of check loads will be increased should the test results fluctuate.

Furnish a lock to secure the recording tape, odometer, totalizer, calibration adjustment, and clock-time imprinter. The Project Manager will lock the equipment and retain the keys before materials are delivered to the roadway.

301.03.3 Reject

Dispose of reject material produced from Department sources as directed.

301.03.4 Crushed Aggregate Course

When crushed aggregate course is a bid item, construct the aggregate surfacing section to the specified typical cross section and profile grade.

Select one of the following two options to construct the aggregate section:

1. Full depth crushed base course.

2. Top 0.15 ft (45 mm) crushed top surfacing, remaining depth crushed base course.

Indicate the selected option and the grade of crushed base course (Type “A” Grade 5 or Type “A” Grade 6) before beginning aggregate production. Only one grade of crushed base course will be permitted. If option 2 is selected use Type “A” Grade 2 crushed top surfacing.

Quality assurance lot sizes, test intervals and material tolerances will be based upon the materials selected.

301.03.5 Aggregate Surfacing Construction

A. Surface Preparation. Prepare the existing roadway surface meeting Section 204 immediately before placing surfacing material.

Do not place aggregate surfacing material on any of the following:

1. Any surface not meeting the dry density requirements for that surface;

2. A rutted or frozen subgrade or aggregate surface; or

3. Any surface not meeting grade or surface smoothness specifications.

B. Pugmill Mixing. Pugmill mix all surfacing aggregates except crushed cover aggregate.

Uniformly mix aggregate surfacing and water in a central plant pugmill mixer. Proportion all blending material, filler, and binder by weight to within plus or minus one-half of one percent of the specified quantity before mixing.

Add the water needed to reach the specified density.

Additional water may be added only once to the aggregate surfacing once its placed on the roadway to replace moisture lost to surface evaporation. If additional water is needed, pick up the mixture and remix it in the pugmill.

1. **Placing.** Transport, place, and spread aggregate surfacing on the roadway.

   Spread in maximum 8-inch (205 mm) compacted layers to the required grade and typical section. Spot fill low areas by scarifying roadway, spreading aggregate and compacting to specified density.

C. Road Mixing. When specified, place, mix and spread the surfacing aggregates on approved surfaces at optimum moisture using motor graders or other approved equipment.

Water may be added to the aggregate to reach optimum moisture during or after crushing.

Once uniformly mixed, spread in maximum 8-inch (205mm) compacted layers to the required grade and typical cross section. Roller compact the spread layer.

Add binder only after it is approved for use.

Uniformly spread the binder over the loose spread surface course. Blend and mix binder uniformly into the surfacing material using approved methods and equipment.

For courses 3 inches (75 mm) thick or less, work the binder into the entire depth. For course depths exceeding 3 inches (75 mm), work the binder into the upper 3 inches (75 mm).

Correct or remove equipment from the work failing to maintain uniform gradation of the material for the entire width and thickness.

D. Compaction. Compact aggregate surfacing to 98 percent of the target density.

The initial target density is the average of the maximum density of at least two tests on samples representing the material to be compacted. Maximum density is determined by MT-230.

The Project Manager will take samples from the materials placed on the roadway. They will be tested and the results averaged with the previous tests to determine a new target density for the material remaining to be placed.

The Project Manager will establish a target density for each course, grade, and type of surfacing aggregate. A new target density will be established if the aggregate characteristics change.

The Department will test the lift(s) of surfacing aggregate in 2000-foot long (610 m) sections based on full typical section width. The in-place dry density of each lift is determined within each section at 10 randomly selected locations. The average of the 10 tests must be a minimum of 98 percent of the target with not more than 2 out of 10 tests being less than 98 percent of the target. The number of tests will be pro-rated for sections with partial lengths and widths. In pro-rated sections, the average of the tests must be a minimum of 98 percent of target density.

Be responsible for controlling compaction and all necessary control testing.

Notify the Project Manager once compaction is complete on a section so it may be tested.

Re-compact sections not meeting density requirements.

Re-compacted sections will be tested at 10 new random locations.

Compaction and testing will continue until the section meets density requirements.

Densities will be determined using MT-210, MT-212, MT-215, MT-218, and MT-230.

E. Trimming. Trim each course of compacted aggregate surfacing to the specified grade and section.

Use trimmings on the inslopes, on sections of uncompleted roadway or return to the pit area. When quantities are measured by the ton (metric ton), excess material returned to the pit is deducted from the pay quantities.

F. Restrictions. The Project Manager may restrict equipment speed and load weights to prevent damage to existing and new work, public thoroughfares or safety.

G. Surface Smoothness. Finish the aggregate surface to the specified grade within Table 301-1 tolerances.

TABLE 301-1

SURFACE SMOOTHNESS

AGGREGATE SIZE	TOLERANCE	DISTANCE
1-1/2 inch (40 mm) and larger	0.08 foot (24 mm)	30 feet (9.2 m)
1 inch (25 mm) and less	0.04 foot (12 mm)	60 feet (18.4 m)

301.03.6 Shoulder Gravel

Compact shoulder gravel to provide a firm, hard surface. Finish the slope to provide a smooth surface from the edge of pavement to the catch point.

Furnish gravel meeting Table 301-2 gradation requirements.

TABLE 301-2

SHOULDER GRAVEL GRADATION REQUIREMENTS

SIEVE SIZE	PERCENT PASSING
3/4 inch (19.0 mm)	100
No. 4 (4.75 mm)	25-85
No. 200 (0.075 mm)	5-20

Cold milled pavement is not required to meet the above gradation when used as shoulder gravel.

301.03.7 Traffic Gravel

Furnish traffic gravel meeting Subsection 701.02.4 or 701.02.6. Traffic gravel is not evaluated under Subsection 105.03.2.

Place traffic gravel in the locations and quantities directed by the Project Manager.

301.04 METHOD OF MEASUREMENT

301.04.1 Aggregate

Aggregate surfacing, blending material, fillers, binder, water, producing, handling, mixing, hauling, placing, spreading, compacting, trimming, use of trimmings, maintenance and all necessary incidentals to complete the work is measured by the cubic yard (cubic meter) or ton (metric ton), as specified.

When removing oversize surfacing material from the roadway, the oversize material is measured by the ton, (metric ton) returned to the aggregate source, and deducted from the total surfacing material placed on the roadway.

A. Measurement by Weight. Aggregate surfacing is measured by the ton (metric ton) under Subsection 301.03.2(C).

Excess material removed from the roadway and returned to the pit area is deducted from the pay quantities.

B. Measurement by Volume. Traffic gravel and shoulder gravel are measured by the cubic yard (cubic meter). Aggregate surfacing is measured by the cubic yard (cubic meter), under the applicable provisions in Subsection 109.01, from:

1. Plan dimensions; or
2. Haul vehicles; or
3. In-place roadway or stockpile volumes.

When measured in place, each course thickness of each grade of surfacing aggregate will be measured at random locations in a section. The section length and number of measurements is the Project Manager's discretion. The thickness measurements for each section are averaged and the average must equal or exceed the plan thickness. The minimum measured thickness at any location must be at least plan thickness less 1/2 the largest aggregate size permitted for the material.

Bring all sections of a completed course not meeting these specifications into compliance before placing the next course.

Aggregate surfacing for small or irregularly shaped areas ordered in writing by the Project Manager, are measured in the haul vehicle under Subsection 109.01.

Aggregate surfacing to fill in subgrade low areas or placed outside the lines and slopes shown in the plans or established by the Project Manager is not measured for payment.

301.04.2 Binder

Binder added at the crusher plant is included in the measurement for the aggregate material.

Binder added to the surfacing material once placed on the roadway is measured by the cubic yard (cubic meter) or ton (metric ton) under Subsection 301.04.1.

When specified as a contract item, haul on binder is measured by the mile-yard (kilometer-cubic meter) or ton-mile (ton-kilometer) under Subsection 206.04.2.

When not specified as a contract item, haul on binder is not measured for payment.

301.04.3 Existing Surface Preparation

When specified, existing surface preparation is measured under Subsection 204.04.

When existing surface preparation is not specified, it is incidental to and included in the aggregate surfacing.

301.04.4 Aggregate Haul

Aggregate haul is not measured for payment unless specified. If specified, it is measured under Subsection 206.04.2.

301.04.5 Compaction

Compaction is incidental to the aggregate surfacing.

301.04.6 Crushed Aggregate Course

The entire aggregate surfacing section will be measured as crushed aggregate course regardless of the construction option selected under 301.03.4.

301.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

Pay Item	Pay Unit
Aggregate	Cubic Yard (cubic meter) or Ton (metric ton)
Binder	Cubic Yard (cubic meter) or Ton (metric ton)
Binder Haul	Mile-Cubic Yard (kilometer-cubic meter) or Ton-Mile (metric ton-kilometer)
Existing Surface Preparation	See Subsection 204.05
Aggregate Haul	Ton-Mile (metric ton-kilometer) or Mile-Cubic Yard (kilometer-cubic meter)

Traffic Gravel	Cubic Yard (cubic meter)
Shoulder Gravel	Cubic Yard (cubic meter)
Crushed Aggregate Course	Cubic Yard (cubic meter) or Ton (metric ton)

Payment at the contract unit price for traffic gravel includes all costs necessary to furnish and place the gravel.

Sale of excess crushed traffic gravel meeting all specifications is the Contractor's option. Traffic gravel meeting all specifications that is crushed and stockpiled on the project, but not placed or sold, will be paid for at 35 percent of the contract unit price. Gravel from a commercial source or a source supplying multiple projects and not transported to the project is not measured for payment.

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the contract.

SECTION 302
BITUMINOUS PAVEMENT PULVERIZATION

302.01 DESCRIPTION

This work consists of processing the existing plant mix surfacing and adding crushed aggregate course material necessary to restore the roadway section.

302.02 MATERIALS

Furnish crushed aggregate course meeting the requirements of Subsection 701.02.1 and one of the following Subsections:

Crushed Aggregate Course Type “A” Grade 5 .....701.02.4
Crushed Aggregate Course Type “A” Grade 6 .....701.02.4

302.03 CONSTRUCTION REQUIREMENTS

302.03.1 Pulverization

Pulverize the bituminous surfacing to the full depth of the existing mat. Pulverize the existing bituminous material so that 100 percent by weight passes a 2-inch (50 mm) sieve.

302.03.2 Equipment

Equipment used to pulverize the existing surfacing must not reduce the aggregate size in the existing surfacing.

302.03.3 Mixing

Add crushed aggregate course as necessary to construct the roadway to the dimensions shown on the typical sections. Uniformly mix the pulverized material and crushed aggregate course by pugmilling or by using the pulverization equipment.

302.03.4 Compaction

Compact the pulverized mixture to 98 percent of the target density. The target density will be determined by one of the following methods:

A. Pugmill Mixing. MT-230 determines maximum density when the pulverized plant mix and crushed aggregate course are blended at a constant ratio by pugmill. The initial target density is the average of the maximum density of the at least two tests on samples representing the material to be compacted.

B. In-place Mixing. MT-219 determines maximum density when in-place pulverized plant mix and crushed aggregate course mixtures are combined at varying ratios.

The Project Manager will determine target densities and moisture corrections. A new target density will be established if the ratio of pulverized material and crushed aggregate course change by more than 20 percent or the Engineer determines the pulverized material characteristics or site conditions change.

302.03.5 Testing and Acceptance

Each lift of pulverized mixture material will be divided into 2000-foot long (610 meter) sections. The in-place dry density of each lift will be determined within each section at ten randomly selected locations. The average of the ten tests must exceed 98 percent of the target density with no more than two out of the ten tests being less than 98 percent of the target density.

Be responsible for controlling compaction and all necessary quality control testing.

Notify the Project Manager when compaction is complete on a section so it can be tested.

Re-compact sections not meeting density requirements. Re-compacted sections will be tested at ten new random locations.

Compaction and testing will continue until the section meets density requirements.

302.04 METHOD OF MEASUREMENT

302.04.1 Aggregate

Crushed aggregate course is measured by the ton (metric ton) under Subsection 301.03.2(C) or by the cubic yard (meter).

302.04.2 Pavement Pulverization

Pavement pulverization is measured by the square yard (square meter. If the average pavement depth varies by more than 0.10 foot (30 millimeters) from plan, the pulverization quantity will be adjusted by the ratio of the actual pavement depth in excess of 0.10 foot (30 mm) divided by the plan depth.

302.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

Pay Item	Pay Unit
Crushed Aggregate Course	Ton (metric ton) or Cubic Yard (cubic meter)
Pavement Pulverization	Square Yard (square meter)

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the contract.

SECTION 303
STOCKPILED SURFACING AGGREGATE

303.01 DESCRIPTION

This is stockpiling surfacing aggregates at the specified location.

303.02 MATERIALS

Furnish materials meeting Subsection 301.02 and the contract requirements.

303.03 AGGREGATE STOCKPILING METHODS

Clear stockpile sites of weeds, roots, stumps, rocks, and other contaminating matter. Dispose of this material under Subsection 201.03.5 or level as directed.

Make the stockpile floor firm, smooth, well drained, uniform in cross-section, and able to support the stockpile.

Place an aggregate bed on the floor to prevent stockpile contamination.

Construct stockpiles in at least three layers. Place each layer approximately 4 feet (1.2 m) high before starting the next layer. Prevent each layer from spilling down over the next lower tier.

Do not drop material stockpiled by conveyor more than 12 feet (3.7 m). Deposit the material in succeeding merging cone piles. Do not permit the piles to exceed 12 feet (3.7 m) in height. Level each completed layer to 4 feet (1.2 m) thick.

Operate stockpiling trucks to produce a stockpile width that exceeds the single dump trucks width. Do not dump over the stockpile sides.

Maintain separation between different gradation stockpiles to prevent aggregates from intermingling.

Use equipment and methods to prevent segregation, degradation, or contamination of the aggregate when constructing stockpiles or delivering materials.

Department sieve test samples are taken from the stockpile to determine degradation.

Re-mix and re-stockpile segregated stockpiles.

Bring stockpiled material failing specifications back within specifications at Contractor expense.

303.04 METHOD OF MEASUREMENT

303.04.1 Aggregate

Stockpile surfacing aggregate is measured at the stockpile site by the ton (metric ton) or cubic yard (cubic meter) under Subsection 301.04.1.

303.04.2 Haul

Haul is measured under Subsection 206.04.2.

303.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

Pay Item	Pay Unit
Aggregate	Ton (metric ton) or Cubic Yard (cubic meter)
Haul	Ton Mile (metric ton kilometer) or Mile Yard (kilometer cubic meter)

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the contract.

SECTION 304
PORTLAND CEMENT TREATED BASE

304.01 DESCRIPTION

This work is the construction of one or more courses of an aggregate, water, and portland cement mixture on a prepared surface.

304.02 MATERIALS

304.02.1 Portland Cement

Use portland cement meeting AASHTO M 85, Type I or Type II requirements.

304.02.2 Water

Use water meeting Subsection 713.01 requirements.

304.02.3 Aggregate

Use aggregate source(s) meeting Section 106 requirements.

Produce aggregates meeting Subsection 701.02.9 requirements.

Assure aggregate is available for sampling at least 60 days before mixing is to begin.

Stockpile the aggregates under Subsection 303.03.

304.02.4 Blending Material

Blending material, consisting of selected natural or crushed mineral aggregate may be combined with the produced aggregate and added to meet gradation requirements. Blending material is by and at Contractor expense. The liquid limit for that portion of the fine aggregate passing the No. 40 (0.425) sieve may not exceed 30, and the plasticity index may not exceed 7, tested under MT-208.

304.03 CONSTRUCTION REQUIREMENTS

304.03.1 Composition and Proportioning

A. Cement. Add portland cement at the job mix target rate set by the Engineer. The initial job mix target rate is the laboratory mix design value.

B. Water. Provide the water to reach plus or minus two percent of the optimum moisture content of the compacted mixture.

C. Aggregate. Establish a single value for each specified aggregate size within the job-mix target limits in Table 701-13 in Subsection 701.02.9 as the target aggregate gradations. Submit it to the Engineer for approval. The job mix tolerances will be applied to the approved target values for final acceptance.

Produce aggregates meeting the approved job-mix aggregate gradation.

304.03.2 Aggregate Production, Testing, and Acceptance

A. General. Perform all work to meet the approved job-mix target values within the specified tolerances.

Sample and test aggregates during production to control gradations.

B. Acceptance Sampling and Testing. The Department will sample the stockpiles for acceptance of the aggregates physical properties, excluding combined gradations. Aggregate gradation samples for acceptance testing are randomly taken at the last practical point before portland cement and water are added to the mixture.

The approximate quantity represented by each sample is 1500 tons (1500 mt). Additional samples will be taken as necessary.

Five samples will represent approximately 7500 tons (7500 mt) which constitutes a lot whenever production schedules and material continuity permit.

The Project Manager may establish a lot of the quantity represented by any number of consecutive random samples from three to seven inclusive when there are short production runs, significant material changes, or other unusual characteristics of the work.

C. Acceptance. Cement treated base is evaluated for gradation requirements on a lot-by-lot basis. Acceptance is made under Subsection 105.03.2

304.03.3 Weather Limitations

Do not mix or place cement treated base when the ambient temperature is below 40 °F (4 °C) or the ground temperature is below 35 °F (2 °C).

Do not incorporate frozen aggregate in the cement treated base or place on a frozen subgrade.

304.03.4 Subgrade Preparation

Prepare the subgrade meeting the applicable requirements of Section 203.

Place cement treated bases on constructed subgrades with existing surface preparation meeting Section 204 requirements.

Trim the subgrade to the thickness tolerances for cement treated base specified in Subsection 304.03.13.

304.03.5 Mixing and Placing

Mix the portland cement treated base in a central plant.

Proportion the aggregate and cement by weight. Water may be proportioned by weight or by volume.

Use weigh systems and meters that are accurate to within plus or minus 0.5 percent of the total quantity batched and are equipped to indicate the total quantity of each ingredient batched between one half to ten hours.

Calibrate the feed system before production mixing begins.

Mix ingredient proportions must be periodically verified from the weigh indicators.

Maintain the cement content to within plus or minus 1.0 percent of the job mix target at any periodic check and within plus or minus 0.3 percent for each day's production. Mixing will be suspended until corrections are made if the cement content is not maintained within the above tolerances.

Uniformly mix aggregate, cement, and water. Modify mix procedures when evidence of a non-uniform mix is identified.

Place cement treated base in equal lifts, with a maximum of 9 inches (230 mm) per lift. When constructing more than one lift, keep the surface of the cement treated base damp until the following lift is placed. Apply the curing seal to the top of the lift being placed if the following lift is not placed within 48 hours of the placement of the preceding lift.

304.03.6 Moisture - Density Test

The moisture and density relationship is determined by Montana Test Method MT-211 using samples taken from the aggregate stockpiles before starting mixing operations.

Once cement treated base production has begun, subsequent moisture - density tests will be made on samples taken from the roadway to verify the moisture - density relationship obtained from the stockpile samples.

The compacted minimum density is 96 percent of the maximum dry density as determined above.

304.03.7 Compaction

Select the compaction method and complete compaction within two hours after mixing.

Field density values are determined under MT-212. One density test is taken at a randomly selected site within a 500-foot (152 m) section being constructed. If the density is below that specified, two additional tests will be taken in that section and the results averaged. The average density for the three tests must be at least the specified density, with none of the three tests less than 93 percent of the maximum dry density.

If the densities do not meet the specified requirements, remove the mix and reconstruct the section at Contractor expense.

The removed mix may be re-processed as aggregate for producing cement treated base.

Remove and re-process any un-compacted sections where the weather has increased the average moisture content above optimum by more than two percent.

304.03.8 Finishing

Shape the compacted surface to the specified lines, grades, and cross sections.

Finish and compact to produce a smooth, dense surface free of compaction planes, cracks, irregularities, or loose material.

Complete the surface finishing within two hours of compaction.

Scarify and re-compact surface deformations in the base caused by equipment.

Do not permit the moisture content to fall below the specified optimum during finishing. Apply water in a uniform fog spray.

304.03.9 Construction Joints

Construct straight vertical-faced transverse joints at the end of each day's work by cutting back into the completed base. Assure the vertical face is free of loose material.

Repair all construction related damage to finished sections of the cement treated base at Contractor expense.

304.03.10 Protection and Curing

Once the cement treated base is finished, apply the specified bituminous curing seal at approximately 0.2 gallon per square yard (0.91 L per square meter).

Keep the cement treated base surface moist between the final compaction and application of the curing seal.

Before applying the curing seal, assure the base surface is tightly knit, free of all loose material, and has sufficient moisture to prevent asphalt penetration.

Apply the specified blotter material at approximately 15 pounds per square yard (8.2 kg per square meter) when directed.

The actual application rate of curing seal and blotter may be adjusted by the Project Manager.

Remove base areas that have absorbed the curing seal down to hard, clean base, within 24 hours of application. Re-moisten if requested and re-apply the curing seal as specified.

Apply the curing seal and blotter material meeting the applicable requirements of Section 409.

304.03.11 Curing Period

Do not perform any work on the cement treated base for at least three days after the curing seal is applied. Do not apply the wearing course until compressive strength reaches 70 percent of design strength. If the cement treated base does not meet 70 percent of the design strength in

seven days, core the material in the presence of a Department employee. The Department will have it tested by an independent certified laboratory at the Contractor's expense.

Immediately repair all curing seal damage through the cure period at Contractor expense.

304.03.12 Maintenance

Maintain the finished surface and seal before placing the wearing course. Make all repairs or patches the full depth of the base.

304.03.13 Surface Smoothness and Thickness Requirements

Finish the cement treated base meeting the requirements of 105.08.

304.03.14 Use of Trimmed Material

Cement treated base trimmings may be used for shoulder construction in lieu of aggregate, subject to the following:

A. The shoulder subgrade is prepared as specified in Subsection 304.03.4.

B. Hardened material is reworked to the maximum size specified for shoulder aggregate before spreading additional shoulder aggregate.

C. The trim material used cannot exceed 25 percent of the contract aggregate shoulder depth per linear foot (305 mm) of shoulder. When trimmings exceed this limit, remove or place the excess in other shoulder areas, subject to the 25 percent limit.

D. Uniformly distribute the trim material in the shoulder area before spreading additional shoulder aggregate.

304.04 METHOD OF MEASUREMENT

304.04.1 Cement Treated Base

Cement treated base is measured by the cubic yard (cubic meter) of completed volume.

Cement treated base placed outside the lines shown in the contract or established by the Project Manager is not measured for payment.

No measurement is made of the width required for forms or equipment operations.

Gravel used in trimmings and lateral support sections outside the planned typical section dimensions are not measured for payment.

304.04.2 Portland Cement

Portland cement is measured by the ton (metric ton) or by the hundredweight (kilogram) under Subsection 109.01.

Measurement includes the cement in trimmings used as shoulder gravel.

Additional cement required for the re-processing specified in Subsection 304.03.7 is not measured for payment.

The payment weight is the invoice weight, up to the job mix target quantity, plus 0.3 percent. Furnish copies of invoices showing weights from certified scales.

Deductions are made for waste and non-project use.

304.04.3 Curing Seal

Curing seal is measured by the gallon (liter) or by the ton (metric ton) under Subsection 409.04.1.

304.04.4 Blotter Material

Blotter material is measured by the ton (metric ton) or by the cubic yard (cubic meter) for the quantity applied and accepted in place.

304.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

Pay Item	Pay Unit
Cement Treated Base	Cubic Yard (cubic meter)
Portland Cement	Ton (metric ton) or Hundred-weight (kilogram)
Curing Seal	Gallon (liter) or Ton (metric ton)
Blotter Material	Ton (metric ton) or Cubic Yard (cubic meter)

No payment is made for cement treated base quantities that exceed plan volume plus 10 percent.

Existing surface preparation is measured and paid for under Subsections 204.04 and 204.05.

Payment at the contract unit price is full compensation for all necessary resources to complete the item of work under the contract.